# A REDESCRIPTION AND REASSIGNMENT OF *LUCIOLA GUERINI* BALLANTYNE (COLEOPTERA: LAMPYRIDAE: LUCIOLINAE)

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## Abstract

The identity of *Luciola guerini* Ballantyne is confirmed and it is placed in the new combination *Atyphella guerini* (Ballantyne). Males and larvae are described.

## Introduction

Ballantyne (1988) resolved confusion over the identities of *Luciola australis* (F.) and *Luciola guerini* Laporte. In Ballantyne (1988) *L. pudica* Olliff was synonymised with *L. australis* F. and specimens redescribed. *Luciola guerini* Laporte, a *nomen nudum*, was validated and an indication of its affinities given, although no specimens were associated. Recent studies (Ballantyne 1992, Ballantyne and Lambkin 2000) on the Australian and New Guinean fauna permit characterisation of *Luciola guerini* Ballantyne in the absence of a type specimen. Specimens conforming to Guérin-Méneville's (1838) description have been found on New Ireland.

## Materials and methods

Taxonomic characters are described in Ballantyne and Lambkin (2000). Abdominal sternites are not directly equivalent to ventrites; however visible abdominal sternites are called ventrites and are referred to by their actual number, which is one more than their visible number. Where possible, characters are given numbers and states to correspond to those used in Ballantyne and Lambkin (2000); e.g. head moderately exposed (4, 1) = character 4, state 1. Abbreviations for taxonomic characters are: FS, antennal flagellar segments; ML, median lobe of aedeagus; MPP, median posterior projection of V7; LL, lateral lobe of aedeagus; PLP, posterolateral projections of ventrite 7; V7, ventrite 7. Repositories of collections are: DAPM, Dept. of Agriculture, Port Moresby; BMNH, The Natural History Museum, London; UQIC, University of Queensland, Dept. of Zoology and Entomology, Brisbane. Alcohol preserved specimens from the indexed collection in UQIC are referred to by tube number for ease of relocation.

## *Atyphella guerini* (Ballantyne), comb. nov.

(Figs 1 – 6)

*Luciola guerini* Laporte, 1833: 151; Masters, 1886: 288; McDermott, 1966: 105 (partim); *nomen nudum*.

*Lampyris australis* F.; Boisduval, 1835: 125; Motschulsky, 1854: 53 (partim); misidentification.

*Lampyris australis* Guérin-Méneville, 1838: 74; *nec* Fabricius, 1775: 201; 1787: 162; 1792: 102; 1801: 104. Type locality New Ireland.

*Luciola australis* Guérin-Méneville; Lacordaire, 1857: 337.

*Luciola australis* (F.); Olivier, 1883: 330; 1885: 362; 1902: 74; 1907: 52; 1909: lxxxi; 1913: 417; Lea, 1909: 108 (partim); 1921: 197; misidentification.

*Luciola (Luciola) australis* (F.); McDermott, 1966: 105 (partim).

*Luciola guerini* Ballantyne, 1988: 164. Type locality Port Praslin, New Ireland; type not located.

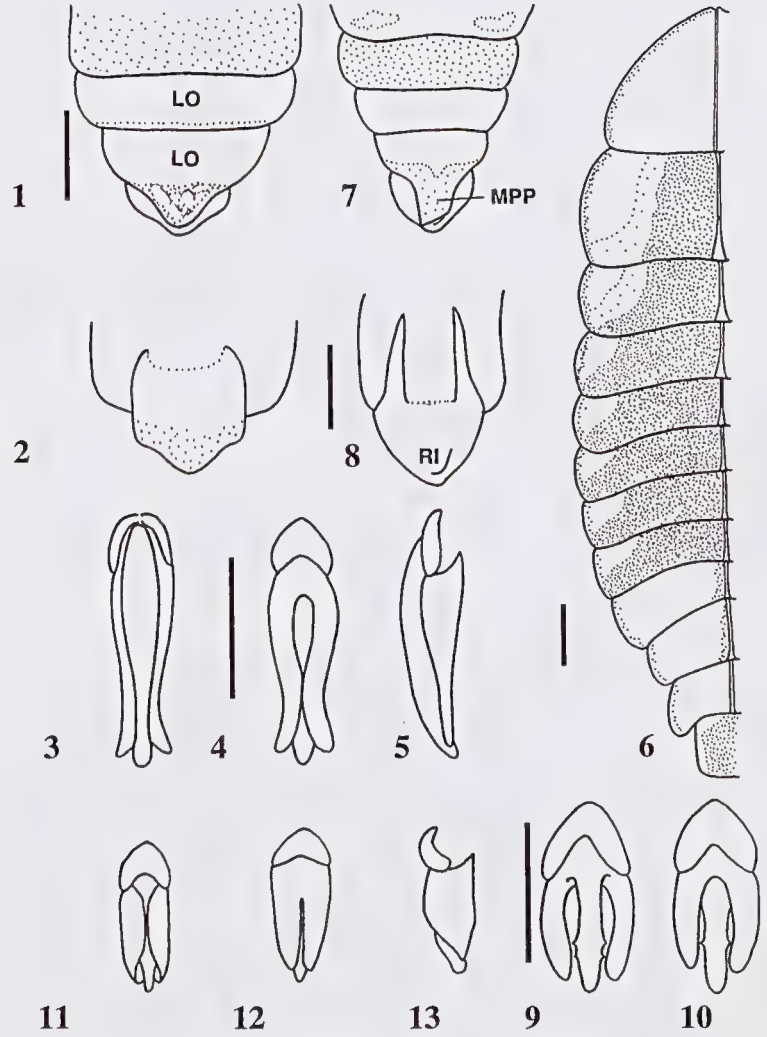
*Material examined.* PAPUA NEW GUINEA (NEW IRELAND): 1 ♂, 15.iv.1937, J. Froggatt (BMNH); 1 ♂, Kavieng, 2°34'S 150°48'E, 11.ii.1966, G Monteith (Tube 248, UQIC); 1 ♂, 6.iii.1966, A Mann (DAPM); 2 ♂♂, Namatanai, 2.v.1940, G. Gee (DAPM, BMNH); 24 ♂♂, 2 larvae, Paruai Village, 30 miles south of Kavieng, 12.ii.1966, G. Monteith (Tube 237, UQIC; some specimens incomplete); 2 ♂♂, Konibiu Plantation, west coast, cacao block, resting on cacao tree, 5.vii.1955, J. Szent-Ivany (DAPM).

*Distinguishing features.* A fairly large (9-11 mm long) species with orange pronotum, very dark brown elytra, similar in size, shape and colour to *Luciola salomonis* Olivier and *Atyphella majuscula* (Lea), distinguished as follows:

*Atyphella guerini:* abdominal ventrites 2-4 mid-brown; ventrite 5 very dark brown; all abdominal tergites pale cream; MPP of V7 (Fig. 1) not considerably prolonged or sub-parallel-sided and with rounded apex; ventral surface of tergite 8 lacking longitudinal curved ridge in left lateral area (Fig. 2); aedeagus (Figs 3-5) length/width 5.2; lateral margins of ML at level of ejaculatory orifice not toothed; LL sub-parallel-sided, not very broad (in lateral view), closely approximate along their dorsal length and divergent in apical fifth; anterior margin of basal piece not produced dorsally. Larva (Fig. 6) with protergum and abdominal terga 7-9 mostly yellow, remainder extensively marked with reddish brown in median area.

*Luciola salomonis:* abdominal ventrites 2-4 yellow; ventrite 5 very dark brown; all abdominal tergites pale brown; MPP of V7 considerably prolonged, sub-parallel-sided and with obliquely truncate apex (Fig. 7); ventral surface of tergite 8 with longitudinal curved ridge in left lateral area (Fig. 8); aedeagus (Figs 9, 10) length/width 2.1; lateral margins of ML toothed at level of ejaculatory orifice; LL convex-sided, not very broad (in lateral view), widely divergent along their dorsal length; anterior margin of basal piece not produced dorsally. Larva not reliably associated (Ballantyne 1992).

*Atyphella majuscula:* abdominal ventrites 2-5 very dark brown; abdominal tergites 2-6 dark brown, tergites 7 and 8 pale yellow; MPP of V7 not considerably prolonged or sub-parallel-sided, with rounded apex; ventral surface of tergite 8 lacking asymmetrical ridges; aedeagus (Figs 11-13) length/width 2.5; lateral margins of ML at level of ejaculatory orifice not toothed; LL sub-parallel-sided, broad (in lateral view), closely approximate along their dorsal length except in apical seventh, where only the inner margins diverge. Larva dorsally pale with scattered brown markings more intense on terga 1-3 (Ballantyne and Lambkin 2000).




**Figs 1-13.** *Atyphella* and *Luciola* spp. (1-6), *Atyphella guerini* male; (7-10), *Luciola salomonis* male; (11 - 13), *Atyphella majuscula* male. (1, 7): ventral aspect, terminal abdomen. (2, 8): dorsal aspect, terminal abdomen. (3-5, 9-13): aedeagus (ventral 3, 9, 11; dorsal 4, 10, 12; left lateral 5, 13). (6): dorsal aspect, larva (left side only). Scale lines = 1 mm. Figures 1-2, 3-5, 7-8, 9-10 and 11-13 share scale lines.

LO = light organ; MPP = median posterior projection, ventrite 7; RI = ridge.

*Description of male.* 9-10 mm long; 4 mm wide. Pronotum, mesoscutellum, mesonotal plates bright orange yellow (85, 0), dorsal surface of abdomen pale orange (88, 1); elytra very dark brown, almost black (86, 0; 87, 0); head, antennae and palpi dark brown; ventral aspect of thorax pale brown; legs 1, 2 orange with dark brown apical fifth of tibiae, and dark brown tarsi; legs 3 orange, with light brown tibiae, and dark brown tarsi; abdominal ventrites 2-4 orange yellow, ventrite 4 may be light brown in lateral areas; ventrite 5 mid-brown; ventrites 6, 7 creamy white.

Pronotum 3.2-4.2 mm wide; 1.7-2.2 mm long; width/length 1.8-2.0; dorsal surface smoothly convex, lateral areas flattened; punctures on disc small, shallow, contiguous or separated by up to width of puncture; midanterior margin of pronotum scarcely produced and broadly rounded; anterolateral corners rounded obtusely; lateral margins diverging along anterior half or more (2, 0), not indented near posterolateral corners (5, 0) and flattened more widely in posterior half (8, 3); posterolateral corners rounded, not projecting strongly beyond posterior margin (6, 0).

Elytra with punctation not conspicuously larger than that of pronotum (10, 0); lateral margins slightly convex-sided (17, 1); with 4 interstitial lines of which lines 1, 2 are as well elevated as sutural ridge, lines 3 and 4 not as well elevated (14, 0); epipleuron not widely expanded in basal half; epipleuron and suture extend to apex of elytron (15, 0; 16, 0), but are not thicker in apical half (13, 0); apex not deflexed (11, 0).

Head moderately exposed in front of pronotum at rest (4, 1); vertex moderately excavated (18, 1); greatest head width 2.0-2.2 mm; smallest interocular width 0.3 mm; eyes moderately separated above labrum (29, 1); antennal socket distance < antennal socket width (antennal sockets very close but not contiguous) (22, 1); mouthparts functional (28, 0); apical segment of labial palpi flattened and dentate on inner margin (39, 1); labrum about as wide as long (26, 1); clypeolabral suture flexible (27, 0); frons 2-3 times antennal socket width, frons vertex junction rounded (23, 0), not elevated in median line (24, 0); eyes moderately separated ventrally (19, 1); posterolateral eye excavation absent (20, 0). Antennae 11-segmented (34, 0), longer than, but less than twice, greatest head width (21, 1); scape and pedicel not produced laterally; flagellar segment 1 longer than pedicel (30, 0); all FS elongate, slender, 2-3 times as long as wide, 7-9 not conspicuously shorter than rest (33, 0); no FS flattened (37, 0), expanded or produced laterally (31, 0; 32, 0; 36, 0); apical segment rounded (35, 0).

Legs lacking metafemoral comb (41, 0); femora and tibiae not curved or swollen along their length or at their apices (42, 0; 43, 0; 44, 0; 45, 0).

Abdomen basal abdominal sternites lacking recurved posterior margins; median longitudinal carina, dimple and trough absent from median ventral surface of V7 (53, 0; 54, 0; 62, 0); posterior margin of V7 (Fig. 1) lacking

incurving hairy lobes or pointed projections (60, 0; 61, 0); light organ in V7 entire (47, 0), reaching sides but not posterior margin of MPP (diffuse fat body extends into MPP) (48, 1) and occupying more than half the area of V7 (49, 0); posterior half of V7 not arched or swollen (56, 0); MPP symmetrical, about as long as broad (51, 1) and narrower than half the width of V7, apically rounded (50, 2), lateral margins converging posteriorly and not engulfed by the apex of tergite 8 (52, 0); MPP lacking median longitudinal trough on ventral surface (55, 0); PLP not developed (57, 0; 58, 0; 59, 0); tergite 8 (Fig. 2) about as wide as long (68, 0), posterior half not abruptly narrowed (69, 0); ventral face of tergite 8 lacking a median longitudinal trough, depressed lateral troughs (64, 0) or any longitudinal developments margining a median area (65, 0); flanges (63, 0), asymmetrical projections and transverse ridges or hooks absent (66, 0); bifurcate anterior margin of tergite 8 about as wide as long (67, 0) and prolongations broad and apically rounded.

Aedeagal sheath sternite asymmetrical in posterior half (70, 1); not extremely long and narrow (71, 0); lacking paraprocts (72, 0); tergite 9 about as long as wide (73, 0).

Aedeagus (Figs 3-5) symmetrical (81, 0); elongate, slender, about 5 times as long as wide; maximum width across LL at their bases/maximum width of ML at same point about 2/1 (74, 1); ML slightly longer than LL (77, 1), not inclined ventrally (75, 0) and preapical area not produced (76, 0); LL separated for longer than half their dorsal length (78, 0), lacking fleshy lobes (82, 0), about as wide at their apices as widest point of ML (79, 1), not separated into broad basal and narrowed apical section (80, 0) and extending to either side of ML at their apices (apices are visible from beneath) (83, 0); basal piece not hooded.

*Larva* (Fig. 6). Lateral margins of terga 1-11 explanate (97, 2), densely covered with very short stout spines and thickened (seen best from beneath) (99, 1); median line (from anterior margin of tergum 1 to posterior margin of tergum 11 not elevated or laterally ridged or margined (102, 0); punctures in anterior half of terga 2-11 not conspicuous, slightly larger than punctures over rest of each tergum (103, 1). Protergum 2.2-2.4 mm long, 3.0-3.3 mm wide (98, 2); median anterior margin barely indented; not narrowed in anterior sixth and lacking anterolateral tubercles (100, 0); posterolateral corners of protergum (101, 0) and terga 2-11 rounded, not produced. Posterolateral corners of terminal tergum not produced (104, 0). Head wider than long, anterior margin widely medianly emarginate. Protergum mainly yellow with narrowly pale brown margins; terga 2-8 with wide dark reddish-brown median marking, extreme lateral margins pale brown, remainder pale yellow (the body outline is visible through the paler tergal margins); terga 9-11 mainly yellow, 9 and 10 with a narrow median dark marking along the median line; tergum 12 mainly dark with lateral margins narrowly yellow.

Ventral surface of thorax mainly yellow with irregular dark markings; ventral abdomen yellow except for very dark brown epipleural plates of sterna 4-8 (spiracles in these plates are pale) and light brown sterna.

## Discussion

Arrangement of taxa in the Luciolinae follows Ballantyne and Lambkin (2000), who ran a cladistic analysis (using 104 characters and 44 lucioline taxa) that defined the distinctiveness of the genus *Atyphella* Olliff. *A. guerini* differs from a similarly coloured Australian species, *A. majuscula*, in only one male character and in certain larval features including coloration (other features of difference such as male ventral coloration and shape of the aedeagal basal piece were not used in Ballantyne and Lambkin's analysis). This character is 65: developments of the ventral face of tergite 8 [*A. majuscula* has state 2; *A. guerini* shares state 0 with 20 of the 23 species assigned to *Atyphella*]. *A. guerini* shares laterally explanate tergal margins with all known *Atyphella* larvae.

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